JY997D26301A

MITSUBISHI
Changes for the Better
PROGRAMMABLE CONTROLLERS
MELSEC-F

FX3U-485ADP-MB

Installation Manual

Manual Number	JY997D26301
Revision	A
Date	April 2007

This manual describes the part names, dimensions, mounting, and specifications of the product. Before use, read this manual and manuals of relevant products fully to acquire proficiency in handling and operating the product. Make sure to learn all the product information, safety information, and precautions.
And, store this manual in a safe place so that you can take it out and read it whenever necessary. Always forward it to the end user.
Registration
MODBUS® is a registered trademark of Schneider Electric S.A.
The company name and the product name to be described in this manual are the registered trademarks or trademarks of each company.

Effective April 2007
Specifications are subject to change without notice.

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Safety Precaution (Read these precautions before use.)

This manual classify the safety precautions into two categories:

DANGER and CAUTION.

DANGER	Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.
CAUTION	Indicates that incorrect handling may cause hazardous conditions, resulting in medium or slight personal injury or physical damage.

Depending on circumstances, procedures indicated by CAUTION may also be linked to serious results.
In any case, it is important to follow the directions for usage.

Associated Manuals

Manual name	Manual No.	Description
FX3U Series User's Manual - Hardware Edition	JY997D16501 MODEL CODE: 09R516	Explains FX3U Series PLC specification details for I/O, wiring, installation, and maintenance.
FX3U/FX3UC Series Programming Manual - Basic & Applied Instruction Edition	JY997D16601 MODEL CODE: 09R517	Describes PLC programming for basic/applied instructions and devices.
FX Series User's Manual - Data Communication Edition	JY997D16901 MODEL CODE: 09R715	Explains N:N link, parallel link, computer link, no protocol communication by RS instructions/FX2N-232IF.
FX3U Series User's Manual - MODBUS Serial Communication Edition	JY997D26201	Explains the MODBUS serial communication network.

How to obtain manuals
For the necessary product manuals or documents, consult with the Mitsubishi Electric dealer from where you purchase your product.

Certification of UL, cUL standards

The FX3U-485ADP-MB unit supports UL and cUL standards.

UL, cUL file number :E95239

Compliance with EC directive(CE Marking)

This document does not guarantee that a mechanical system including this product will comply with the following standards.
Compliance to EMC directive of the entire mechanical system should be checked by the user / manufacturer. For more details please contact the local Mitsubishi Electric sales site.

Requirement for Compliance with EMC directive

The FX3U-485ADP-MB is compliant through direct testing (of the identified standards below) and design analysis (through the creation of a technical construction file) to the European Directive for Electromagnetic Compatibility (89/336/EEC) when used as directed by the appropriate documentation.

Standard	Remark
EN61131-2:2003 Programmable controllers - Equipment requirements and tests	Compliance with all relevant aspects of the standard. • Radiated Emissions • Mains Terminal Voltage Emissions • RF immunity • Fast Transients • ESD • Surge • Voltage drops and interruptions • Conducted • Power magnetic fields

Caution for compliance with EC Directive

Installation in Enclosure
Programmable logic controllers are open-type devices that must be installed and used within conductive control boxes. Please use the FX3U Series programmable logic controllers while installed in conductive shielded control boxes. Please secure the control box lid to the control box (for conduction). Installation within a control box greatly affects the safety of the system and aids in shielding noise from the programmable logic controller.

1. Outline

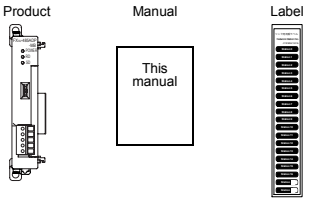
The FX3U-485ADP-MB communication special adapter (hereinafter called 485ADP-MB) is a special adapter for RS-485 communication with a terminal block (European type).
485ADP-MB is an isolated signal exchange unit of RS-485 serial data communication between the PLC and RS-485 device.
The FX3U-485ADP-MB features all functionality that is available with the FX3U-485ADP, except that it also has MODBUS communication available.

1.1 Communication Function

Communication type	Function
N:N network	Data transfer between up to eight FX Series PLCs by the simple program.
Parallel link	Data transfer between two FX Series PLCs specifying master/slave station.
Computer link	Data transfer via dedicated protocol between PLC and computer (specified as the master station).
Non-protocol communication	Serial communication via non-protocol between PLC and RS-485 device.
Inverter communication	Controlling Mitsubishi's FREQROL inverter using inverter communication instruction.
MODBUS communication	Data transfer for up to 16 slaves controlled by one master.

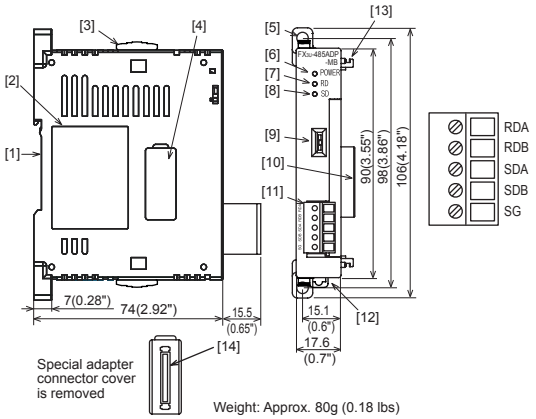
1.2 Incorporated Items

Check if the following product and items are included in the package:



The label should be applied on the front of 485ADP-MB for checking station numbers in N:N network, computer link, MODBUS Communication, etc.

1.3 External Dimensions, Part Names and Terminal Layout

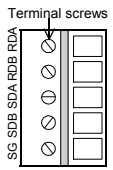


Weight: Approx. 80g (0.18 lbs)

[1] DIN rail mounting groove (DIN rail: DIN46277)
[2] Name plate
[3] Special adapter slide lock:
Used to connect special adapter on left side of this special adapter.
[4] Special adapter connector cover:
Remove this cover for connecting special adapter on the left side.
[5] Direct mounting hole:2 holes of ϕ4.5 (0.18") (mounting screw: M4 screw)
[6] POWER LED (green): Lit while 5V DC power is supplied from main unit.
[7] RD LED (red):
Lit while receiving data from connected RS-485 device.
[8] SD LED (red):
Lit while sending data to connected RS-485 device.
[9] Terminal resistor selector switch (330Ω/OPEN/110Ω)
[10] Special adapter connector:
Used to connect this special adapter to PLC main unit or special adapter.
[11] Terminal block (European type) for connecting RS-485 device
Use to connect RS-485 device to 485ADP-MB.
[12] DIN rail mounting hook
[13] Special adapter fixing hook
[14] Special adapter connector:
Used to connect communication special adapter or analog special adapter to this adapter on left side.

1.4 Terminal Configuration

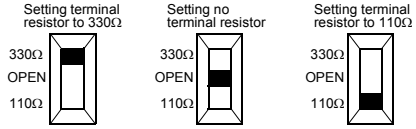
The terminal configuration of the RS-485 terminal on the 485ADP-MB is shown below.



Signal name	Function	Signal direction	
		485ADP-MB	RS-485 equipment
RDA(RXD+)	Receive data	←	
RDB(RXD-)			
SDA(TXD+)	Send data	→	
SDB(TXD-)			
SG(GND)	Signal ground	–	

1.5 Terminal Resistor Selector Switch

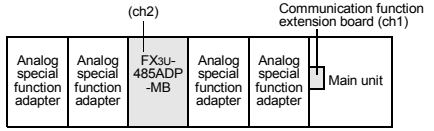
485ADP-MB has a built-in terminal resistor.
A terminal resistor may be required depending on the communication type. Refer to the following manual for the terminal resistor setting.
→ **Refer to FX Series User's Manual - Data Communication Edition, and FX3U Series User's Manual - MODBUS Serial Communication Edition.**



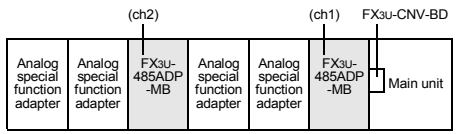
2. Channel Allocation

Up to two communication ports can be added to the main unit.
Communication port channels are automatically allocated. The closer communication special adapter to the main unit is ch1.

- Using one communication special adapter + communication expansion board



- Using two communication special adapters



3. Installation

For details of installation/uninstallation, refer to the manual of the PLC main unit to be used.

→ **Refer to the FX3U Series User's Manual - Hardware Edition.**

INSTALLATION PRECAUTIONS ⚠DANGER

- Cut off all phases of the power source externally before starting the installation or wiring work, thus avoiding electric shock or damages to the product.

INSTALLATION PRECAUTIONS ⚠CAUTION

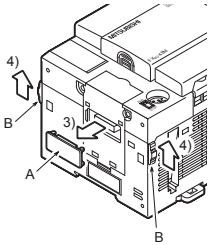
- Use the product in the environment within the general specifications described in PLC main unit manual (Hardware Edition).
  Never use the product in areas with dust, oily smoke, conductive dusts, corrosive gas (salt air, Cl_2, H_2S, SO_2, or NO_2), flammable gas, vibrations or impacts, or expose it to high temperature, condensation, or wind and rain.
  If the product is used in such a place described above, electrical shock, fire, malfunction, damage, or deterioration may be caused.
- When drilling screw holes or wiring, cutting chips or wire chips should not enter ventilation slits.
  Such an accident may cause fire, failure or malfunction.
- Do not touch the conductive parts of the product directly, thus avoiding failure or malfunction.
- Fix the special adapter securely to the specified connector.
  Incorrect connection may cause malfunction.

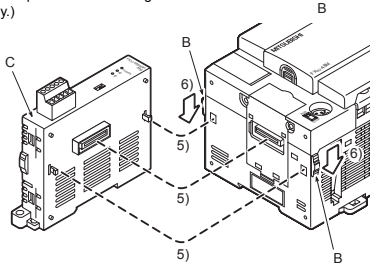
3.1 Connection to the FX3U Series PLC

- Refer to the procedure 2) for configuring a new system.
- Refer to the procedure 1) for adding product to an existing system.

Procedure

1) Turn off the power.
   Disconnect all the cables connected to the PLC main unit and special adapter.
   Dismount the main unit and special adapter mounted on DIN rail or mounted directly using screws.
2) Install an expansion board to the main unit.
   For installation of expansion board, refer to the following manual:
   → **Refer to the FX3U Series User's Manual - Hardware Edition.**
3) Remove the special adapter connector cover on the expansion board (Right fig.A).
   In case of connecting this product to another special adapter, please replace the 'expansion board' in the above description with a 'special adapter' and perform the procedure as indicated.
4) Slide the special adapter slide lock (Right fig.B) of the main unit.
   In case of connecting this product to another special adapter, please replace the 'main unit' in the above description with a 'special adapter' and perform the procedure as indicated. (Please replace the following procedures similarly.)
5) Connect the special adapter (Right fig.C) to the main unit as shown on the right.
6) Slide back the special adapter slide lock (Right fig.B) of the main unit to fix the special adapter (Right fig.C).





Connection precautions

Connect all the high-speed I/O special adapters before connecting other special adapters when they are used in combination.
Do not connect a high-speed I/O special adapter on the left side of a communication or analog special adapter.

4. Wiring

For details of wiring, refer to FX Series User's Manual - Data Communication Edition, and FX3U Series User's Manual - MODBUS Serial Communication Edition.

WIRING PRECAUTIONS ⚠DANGER

- Cut off all phases of power source externally, before installation or wiring work in order to avoid electric shock or damage of product.

WIRING PRECAUTIONS ⚠CAUTION

- Never let cutting chips and wire chips enter the ventilation slits of this product or PLC when performing wiring.
  Otherwise, fire, failure or malfunction may occur.
- Make sure to observe the precautions below in order to prevent any damage to a machine or any accident which might be caused by abnormal data written in the PLC due to the influence of noise:
  1) Do not lay close or bundle with the main circuit, high-voltage power line, or load line.
     Otherwise effects of noise or surge induction are likely to take place.
     Keep a safe distance of more than 100 mm (3.94") from the above when wiring.
  2) Ground the shield wire or shield of a shielded cable at one point on the PLC.
     However, do not ground at the same point as high voltage lines.
- Observe the following items to wire the lines to the European terminal board.
  Ignorance of the following items may cause electric shock, short circuit, disconnection, or damage of the product.
  - The end disposal size of the cable should follow the dimensions described in this manual.
  - Tighten to a torque should follow the torque described in this manual.
  - Twist the end of strands and make sure there is no loose wires.
  - Do not solder-plate the electric wire ends.
  - Connect only the electric wires of regulation size.
  - Fix the electric wires so that the terminal block and connected parts of electric wires are not stressed directly.

Wiring precaution

- Do not attach the terminal block (replacement European terminal block) for connecting RS-485 device which is already wired to FX3U-485-BD.
  If attached as its left and right are confused, the terminal configuration becomes upside down and no communication is performed.

5. Specification

STARTUP AND MAINTENANCE PRECAUTIONS ⚠CAUTION

- Do not disassemble or modify the unit.
  Doing so may cause failure, malfunction or fire.
  * For repair, contact your local Mitsubishi Electric distributor.
- Do not drop the product or do not exert strong impact, doing so may cause damage.

DISPOSAL PRECAUTIONS ⚠DANGER

- Please contact a company certified in the disposal of electronic waste for environmentally safe recycling and disposal of your device.

TRANSPORT AND STORAGE PRECAUTIONS ⚠CAUTION

- During transportation avoid any impact as the product is a precision instrument. Check the operation of the product after transportation.

5.1 Applicable PLC

Model name	Applicability
FX3U Series PLC	Ver. 2.40 and later for MODBUS communication Ver. 2.20 and later for all communication functions except MODBUS

The version number can be checked by monitoring D8001, as well the last three digits indicate the version number.

5.2 General Specifications

For general specifications, refer to the PLC main unit manual.
The following items are not equivalent to the PLC main unit.

Item	Specification	
Dielectric withstand voltage	500V AC for one minute	Conforming to JEM-1021 Between all external terminals and ground terminal of PLC main unit
Insulation resistance	5MΩ or more by 500V DC megger	

5.3 Power Supply Specification

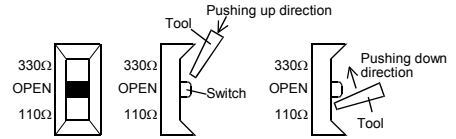
Item	Specification
Current consumption	20mA/5V DC (fed from the PLC power supply)

5.4 Performance Specification

Item	Specification
Transmission standard	Conforming to RS-485/RS-422
Type of isolation	Photocoupler isolation
Transmission distance	Total extension distance: 500m (1640' 5") or less [50m (164' 0") or less if FX2N-485-BD, FX1N-485-BD or FX3U-485-BD is installed to connected equipment]
Connection method	European type terminal block, AWG 22-20 (when inserting one twisted pair cable), AWG 22 (when inserting two twisted pair cables) Tightening torque: 0.22 to 0.25 N•m
Number of occupied I/O points	0 point (This number is not related to the maximum number of input/output points of the PLC.)
Communication method	Half-duplex
Baud rate	Computer link, non-protocol communication, and MODBUS: 300/600/1200/2400/4800/9600/19200 bps
Communication format	N:N network, Parallel link Computer link (dedicated protocol: format 1/format 4), Non-protocol, and MODBUS (RTU, ASCII)
LED display: LED color	Power: green, RD: red, SD: red

6. Operation of Terminal Resistor Selector Switch

Use the tip of tweezers, tip of mechanical pencil, minute screwdriver, or the tool whose tip width is about 0.8mm (0.03") when operating the terminal resistor selector switch.



Either 'push down' or 'push up' the switch to change the setting as indicated in the figure above.
Confirm the clicking noise when setting the switch.

This manual confers no industrial property rights or any rights of any other kind, nor does it confer any patent licenses. Mitsubishi Electric Corporation cannot be held responsible for any problems involving industrial property rights which may occur as a result of using the contents noted in this manual.

Warranty

Mitsubishi will not be held liable for damage caused by factors found not to be the cause of Mitsubishi; opportunity loss or lost profits caused by faults in the Mitsubishi products; damage, secondary damage, accident compensation caused by special factors unpredictable by Mitsubishi; damages to products other than Mitsubishi products; and to other duties.

⚠ For safe use

- This product has been manufactured as a general-purpose part for general industries, and has not been designed or manufactured to be incorporated in a device or system used in purposes related to human life.
- Before using the product for special purposes such as nuclear power, electric power, aerospace, medicine or passenger movement vehicles, consult with Mitsubishi Electric.
- This product has been manufactured under strict quality control. However when installing the product where major accidents or losses could occur if the product fails, install appropriate backup or failsafe functions in the system.

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